Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 (cancelled).

2 (currently amended). The method as claimed in claim ~~1~~ 3 wherein the extracted features include color and textual features.

3 (currently amended). ~~The method as claimed in claim 1~~ A method for classification of image regions by probabilistic merging of a class probability map and a cluster probability map, said method comprising the steps of:

a) extracting one or more features from an input image composed of image pixels;

b) performing unsupervised learning based on the extracted features to obtain a cluster probability map of the image pixels;

c) performing supervised learning based on the extracted features to obtain a class probability map of the image pixels; and

d) combining the cluster probability map from unsupervised learning and the class probability map from supervised learning to generate a modified class probability map to determine the semantic class of the image regions;

wherein the unsupervised learning in step b) comprises the steps of:

determining number of clusters in the input image;

estimating ~~the~~ parameters of a probabilistic model describing the clusters; and

assigning each image pixel to one of the clusters according to the probabilistic model.

4 (currently amended). ~~The method as claimed in claim 1~~ A method for classification of image regions by probabilistic merging of a class probability map and a cluster probability map, said method comprising the steps of:

a) extracting one or more features from an input image composed of image pixels;

b) performing unsupervised learning based on the extracted features to obtain a cluster probability map of the image pixels;

c) performing supervised learning based on the extracted features to obtain a class probability map of the image pixels; and

d) combining the cluster probability map from unsupervised learning and the class probability map from supervised learning to generate a modified class probability map to determine the semantic class of the image regions;

wherein the supervised learning of step c) comprises the steps of:

creating a labeled training set belonging to a particular class;

determining a number of components required to learn a density function of a given class with the labeled training set as input;

estimating parameters of each density function in a mixture model; and

assigning each image pixel to one of the classes according to the mixture model.

5 (currently amended). ~~The method as claimed in claim 1~~ A method for classification of image regions by probabilistic merging of a class probability map and a cluster probability map, said method comprising the steps of:

a) extracting one or more features from an input image composed of image pixels;

b) performing unsupervised learning based on the extracted features to obtain a cluster probability map of the image pixels;

c) performing supervised learning based on the extracted features to obtain a class probability map of the image pixels; and

d) combining the cluster probability map from unsupervised learning and the class probability map from supervised learning to generate a modified class probability map to determine the semantic class of the image regions;

wherein the unsupervised learning of step b) comprises the steps of:

determining a number of clusters in the input image using a Kullback-Leibler (KL) divergence method;

estimating mean and covariance parameters of a normally distributed probabilistic model describing the clusters using an Expectation-Maximization (EM) technique; and

assigning each image pixel to one of the clusters according to the normally distributed probabilistic model by computing a posterior probability using Bayes rule.

6 (currently amended). ~~The method as claimed in claim 1~~ A method for classification of image regions by probabilistic merging of a class probability map and a cluster probability map, said method comprising the steps of:

a) extracting one or more features from an input image composed of image pixels;

b) performing unsupervised learning based on the extracted features to obtain a cluster probability map of the image pixels;

c) performing supervised learning based on the extracted features to obtain a class probability map of the image pixels; and

d) combining the cluster probability map from unsupervised learning and the class probability map from supervised learning to generate a modified class probability map to determine the semantic class of the image regions;

wherein the supervised learning of step c) comprises the steps of:

creating a labeled training set belonging to a particular class;

determining a number of components required to learn a density function of a given class with the labeled training set as input, using a Kullback-Leibler (KL) divergence method;

estimating the mean and covariance parameters of each density function in a Gaussian mixture model using an Expectation-Maximization (EM) technique; and

assigning each image pixel to one of the classes according to the Gaussian mixture model.

7 (currently amended). ~~The method as claimed in claim 1~~ A method for classification of image regions by probabilistic merging of a class probability map and a cluster probability map, said method comprising the steps of:

a) extracting one or more features from an input image composed of image pixels;

b) performing unsupervised learning based on the extracted features to obtain a cluster probability map of the image pixels;

c) performing supervised learning based on the extracted features to obtain a class probability map of the image pixels; and

d) combining the cluster probability map from unsupervised learning and the class probability map from supervised learning to generate a modified class probability map to determine the semantic class of the image regions;

wherein step d) comprises the steps of:

maximizing a joint likelihood of class and cluster by computing a class conditional probability using Bayes rule;

assigning each of the cluster probability maps to one of the classes according to the class conditional probability; and

computing the modified class probability map by weighting each pixel probability of the class probability map by the corresponding pixel probability of the cluster probability map.

8 (currently amended). The method as claimed in claim ~~1~~ 3 wherein step a) comprises the step of extracting and computing low-level features

selected from the group including color, texture, shapes, and wavelet coefficients from the input image.

9 (currently amended). The method as claimed in claim ~~1~~ 3 wherein step a) comprises the step of detecting and extracting semantic-level features selected from the group including faces, people, and structures from the input image.

10-18 (cancelled).

19 (new). A computer program product for classification of image regions by probabilistic merging of a class probability map and a cluster probability map comprising: a computer readable storage medium having a computer program stored thereon for performing the steps of claim 3.

20 (new). The method as claimed in claim 4 wherein the extracted features include color and textual features.

21 (new). The method as claimed in claim 4 wherein step a) comprises the step of extracting and computing low-level features selected from the group including color, texture, shapes, and wavelet coefficients from the input image.

22 (new). The method as claimed in claim 4 wherein step a) comprises the step of detecting and extracting semantic-level features selected from the group including faces, people, and structures from the input image.

23 (new). A computer program product for classification of image regions by probabilistic merging of a class probability map and a cluster probability map comprising: a computer readable storage medium having a computer program stored thereon for performing the steps of claim 4.

24 (new). The method as claimed in claim 5 wherein the extracted features include color and textual features.

25 (new). The method as claimed in claim 5 wherein step a) comprises the step of extracting and computing low-level features selected from the group including color, texture, shapes, and wavelet coefficients from the input image.

26 (new). The method as claimed in claim 5 wherein step a) comprises the step of detecting and extracting semantic-level features selected from the group including faces, people, and structures from the input image.

27 (new). A computer program product for classification of image regions by probabilistic merging of a class probability map and a cluster probability map comprising: a computer readable storage medium having a computer program stored thereon for performing the steps of claim 5.

28 (new). The method as claimed in claim 6 wherein the extracted features include color and textual features.

29 (new). The method as claimed in claim 6 wherein step a) comprises the step of extracting and computing low-level features selected from the group including color, texture, shapes, and wavelet coefficients from the input image.

30 (new). The method as claimed in claim 6 wherein step a) comprises the step of detecting and extracting semantic-level features selected from the group including faces, people, and structures from the input image.

31 (new). A computer program product for classification of image regions by probabilistic merging of a class probability map and a cluster probability map comprising: a computer readable storage medium having a computer program stored thereon for performing the steps of claim 6.

32 (new). The method as claimed in claim 7 wherein the extracted features include color and textual features.

33 (new). The method as claimed in claim 7 wherein step a) comprises the step of extracting and computing low-level features selected from the group including color, texture, shapes, and wavelet coefficients from the input image.

34 (new). The method as claimed in claim 7 wherein step a) comprises the step of detecting and extracting semantic-level features selected from the group including faces, people, and structures from the input image.

35 (new). A computer program product for classification of image regions by probabilistic merging of a class probability map and a cluster probability map comprising: a computer readable storage medium having a computer program stored thereon for performing the steps of claim 7.